



Operating Instructions for Cross-Beater Mill, Type SK 100

Retsch®

Guide to Operating Instructions

The present operating instructions for the SK 100 cross-beater mill give all the necessary information for the areas mentioned in the table of contents.

They give instructions to the target group(s) defined for the respective areas on how to handle the SK 100 in a safe and proper fashion. Knowledge of the relevant chapters is, for the respective target group(s), a prerequisite for safe and proper handling.

The present technical documentation is a work of reference and a training manual. Each of the individual chapters is an independent unit.

These operating instructions do not include any repair instructions. In the case of any necessary instructions, please contact your supplier or Retsch GmbH & Co. KG directly.

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Safety

Target group: All persons concerned with the machine in any way.

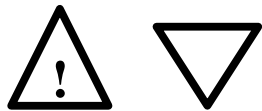
The SK 100 is an ultra-modern, efficient product from Retsch GmbH. It is state of the art. If the user handles machine in accordance with the material and is familiar with the present technical documentation, it is completely safe operationally.

Safety instructions

You, as the operator, must ensure that the persons instructed to work with the SK 100:

- * have noted and understood all the regulations for the safety area,
- * know all instructions for action and regulations of the target groups relevant to them before work is commenced,
- * have access to the technical documentation at all times and without problem,
- * that new personnel is familiarised before commencement of work on the SK 100 with the safe and proper handling either by a verbal introduction from a competent person and/or by means of the present technical documentation.
- * Improper operation can result in personal injury and damage to property. You are responsible for your own safety and that of your personnel.
- * Ensure that no unauthorised persons have access to the SK 100.

For your own protection, make sure that you are given confirmation that your personnel have received instruction in use of the SK 100. You will find a draft of a related form after the chapter on safety.



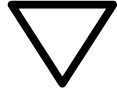
We exclude any claims for compensation for material damage and personal injury caused by non-observance of the following safety instructions

Warning signs

We give warnings using the following symbols:



Personal injury



Material damage

Repairs

These operating instructions do not include any repair instructions. For your own safety, repairs may only be carried out by Retsch GmbH or an authorised agent (service technicians).

Should the need arise, please notify:

The Retsch agency in your country

Your supplier

Retsch GmbH directly

Your service address:

Confirmation

I have noted the foreword and the safety chapter.

Operator's signature

Service technician's signature

Technical Data

Machine type designation: SK 100

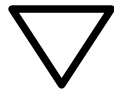
Application with proper use

SK 100 standard

For uses where primarily the same materials are to be ground in larger quantities and it is not absolutely necessary to open the door after every grinding operation to clean the grinding chamber.

SK 100 comfort

For uses where always different materials are to be ground and it is necessary to open the door after every grinding operation to clean the grinding chamber.



Do not make any modifications to the machine and use only RETSCH approved spares and accessories.

Failure to comply will invalidate the CE declaration and guarantee.

This unit is not designed as a production machine, but as a laboratory device intended for 8 hours single shift operation.

Both types crush medium-hard to hard and brittle materials with a hardness of about 6 according to Mohs.

They are conceived especially for crushing the following materials:

ashes	drugs	ores	animal feed
rocks	glass	resins	potassium
coal	coke	grains	artificial resins
minerals	pellets	salts	slags
bricks	bauxite	gypsum	pyrites

and many other, similar materials.

The achievable end fineness depends on the hole width of the bottom sieve and the grinding properties of the material to be ground. In favourable cases, finenesses of <100µm can be achieved.

For further information, our application laboratory is at your disposal.

Drive

SK100 standard

1 and 3 phase AC motor

SK100 comfort

1 and 3 phase AC motor with brake

Speed

2850min⁻¹

Rated power

1100 Watt

Feed grain size

max. 20mm

Collecting vessel capacity

5,000 ml or
30,000ml

Noise emissions

Noise measurement according to DIN 45635-31-01-KL3

Noise data are dependent on the fracturing properties for the product being ground.

Example:

Sound power level: $L_{WA} = 95 \text{ dB(A)}$

Workplace-related emission $L_{pAeq} = 86 \text{ dB(A)}$

Operating conditions:

Sample material: quartz, grain size $< 3 \text{ mm}$

Filling ratio of grinding chamber: feeding quantity each until motor rated power is reached.

Noise data

Workplace-related emission at a distance of 1 m:

72 to 80 dB(A) as a function of the material being ground

Type of protection

IP 54

Unit dimensions

Height approx.560	Width approx.420	Depth approx.445
with base frame		
Height approx.1183	Width approx.560	Depth approx.700
with base frame and DR 100		
Height approx.1443	Width approx.560	Depth approx.700

Unit weights

SK 100 standard	net approx. 32kg
with base frame	net approx. 54kg
with base frame and DR 100	net approx. 62kg
SK 100 comfort	net approx. 36kg
with base frame	net approx. 58kg
with base frame and DR 100	net approx. 66kg

Required standing area

700 mm x 560 mm; no safety distances necessary!)

Materials and composition

Collecting vessel 5l and bottom sieves of stainless steel

Material No.	1.4301		
Short name	X 5 CrNi 18 9		
Composition		Fe	77.325 %
		Cr	18.000 %
		Ni	02.500 %
		Mn	02.000 %
		Si	01.000 %
		C	00.070 %
		P	00.045 %
		S	00.030 %

Filling funnel and housing of aluminium

Material No.	239		
Short name	G-Al Si 10 Mg		
Composition		Al	87.300 %
		Si	11.000 %
		Fe	00.500 %
		Mg	00.500 %
		Mn	00.400 %
		Ti	00.150 %
		Zn	00.100 %
		Cu	00.050 %

Grinding insert of stainless steel

Material No.	1.4312		
Short name	G-X 10 CrNi 18 8		
Composition		Fe	66.805 %
		Cr	19.500 %
		Ni	10.000 %
		Si	02.000 %
		Mn	01.500 %
		C	00.120 %
		P	00.045 %
		S	00.030 %

Grinding insert of cast iron

Short name	GG-20		
Composition		Fe	93.600 %
		C	03.650 %
		Si	01.800 %
		Mn	00.550 %
		P	00.300 %
		S	00.100 %

Grinding insert of special steel

Material No.	1.2601		
Short name	X 165 CrMoV 12		
Composition		Fe	83.590 %
		Cr	12.000 %
		C	01.750 %
		Mo	00.700 %
		W	00.600 %
		V	00.500 %
		Si	00.400 %
		Mn	00.400 %
		P	00.030 %
		S	00.030 %

The percentages given here for the composition fractions are averages.

Cross beater

Material No.			
Short name	GTW-38		
Composition		Fe	95,465 %
		C	03,250 %
		Si	00,650 %
		Mn	00,400 %
		P	00,055 %
		S	00,180 %

Cross beater of stainless steel

Material No.	1.4541		
Short name	X 6 CrNiMoTi 17 12 2		
Composition		Fe	62.345 %
		Cr	18.500 %
		Ni	13.500 %
		Mo	02.500 %
		Mn	02.000 %
		Si	01.000 %
		C	00.080 %
		P	00.045 %
		S	00.030 %

Impact plates of special steel

Material No.	1.2080		
Short name	X 210 Cr 12		
Composition		Fe	84.890 %
		Cr	12.000 %
		C	02.200 %
		Mn	00.450 %
		Si	00.400 %
		P	00.030 %
		S	00.030 %

Impact plates of stainless steel

Material No.	1.4034		
Short name	X 46 Cr 13		
Composition		C	00.500 %
		Fe	82.925 %
		Cr	14.500 %
		Si	01.000 %
		Mn	01.000 %
		P	00.045 %
		S	00.030 %

Impact plates of steel without heavy metals

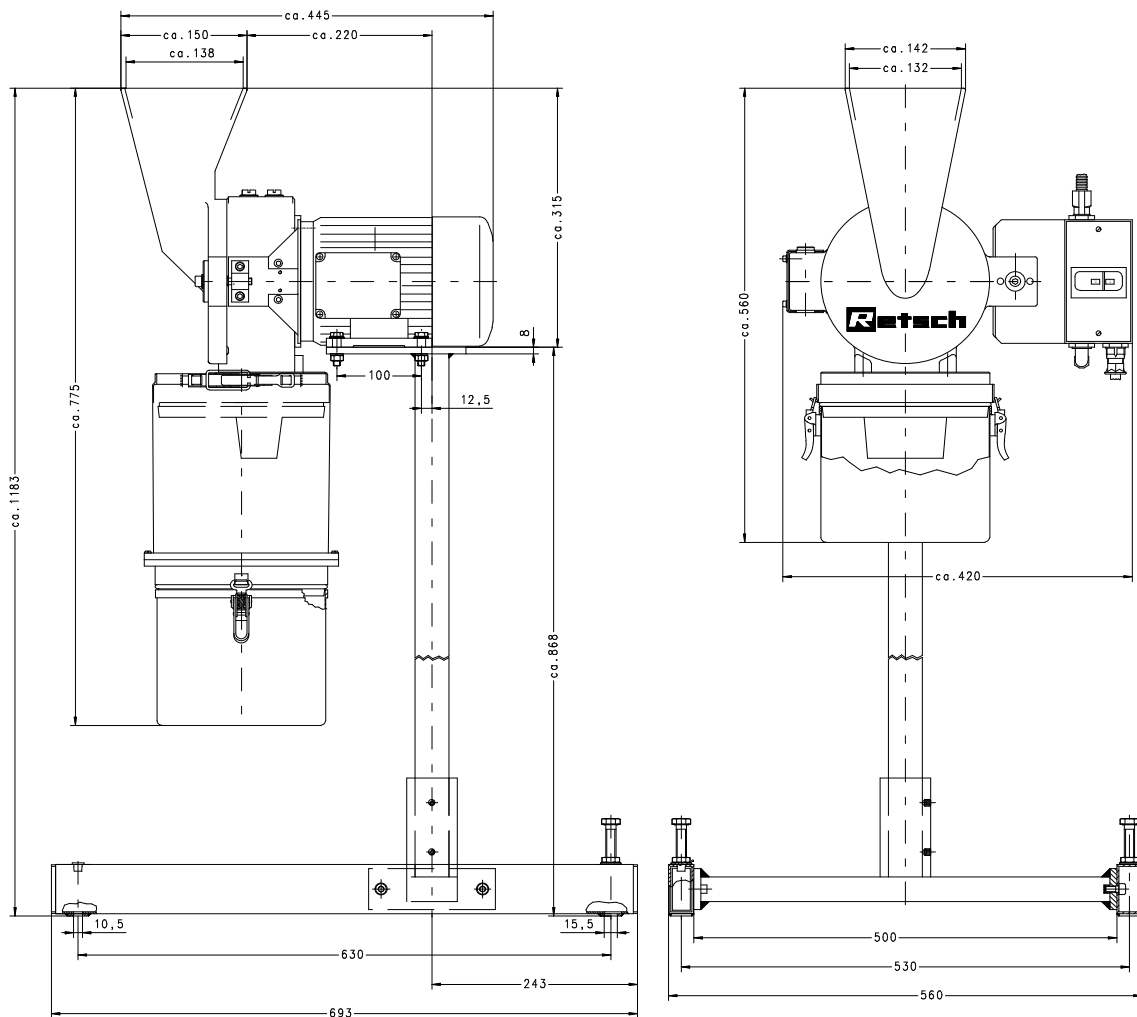
Material No.	1.1740		
Short name	C 60 W		
Composition		Fe	98,008 %
		C	00,650 %
		Mn	00,800 %
		Si	00,400 %
		P	00,035 %
		S	00,035 %

Bottom sieves of steel without heavy metals

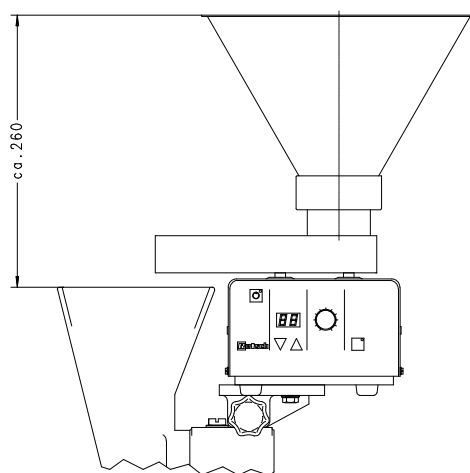
Material No.	1.0344		
Short name	St 1203		
Composition		Fe	98,992 %
		C	00,100 %
		Cu	00,350 %
		N	00,008 %
		Mn	00,450 %
		P	00,050 %
		S	00,050 %

The percentages given here for the composition fractions are averages.

Dimensions sheet



with DR 100/75



Transport and setting up

Target groups: Operators, forwarders, users

Packing

The packing is adjusted to the transport route. It complies with the generally applicable packing regulations.



Please keep the packing for the whole of the guarantee period. If, in the case of a complaint, the unit is returned in inadequate packing, your guarantee rights may be jeopardised.

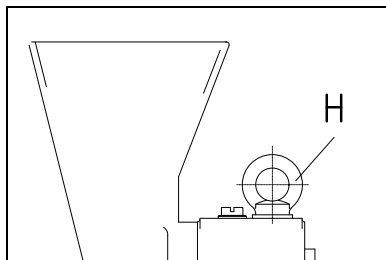


Fig.1

Transport

Use the ring bolt **H** to transport the SK 100. **Fig.1**



The SK 100 may not be subjected to shocks, shaken or thrown during transport. Otherwise the electrical and mechanical components may be damaged.



Temperature fluctuations

In the case of major temperature fluctuations (e.g. with transportation by air), the SK 100 must be protected against condensation. Otherwise the electronic components may be damaged.

Intermediate storage

Ensure that the SK 100 is also kept dry when subject to intermediate storage.

Scope of supply

- * SK 100
- * Filter hose with adapter
- * 5l collecting vessel
- * Operating instructions

Check that the consignment is complete, including the individually ordered accessories.

Check that the SK 100 works perfectly (see chapter on operation).

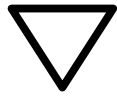


If the consignment is incomplete and/or damaged during transport, you must notify the forwarder and Retsch GmbH without delay (within 24 h). Later complaints may not be considered.

Parameters for setting-up location

Ambient temperature

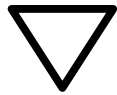
The ambient temperature should be between 5°C and 40°C.



When the ambient temperature exceeds or falls below that specified, the electronic and mechanical components may be damaged, and performance data changed to an unknown extent.

Relative humidity

Maximum relative humidity 80% at temperatures up to 31°C, falling in linear fashion down to 50% relative humidity at 40°C



At higher humidity, the electronic and mechanical components may be damaged, and performance data changed to an unknown extent.

Setting-up altitude

max. 2000 m above seal level

Setting up with base frame

We recommend that the SK 100 be mounted on an base frame which is available as accessory. **Fig.1**

Montage:

- * Connect centre cross piece **9** and foot side parts **8** using the cylinder-head screws **1**
- * Put covering caps **2** on the projecting thread
- * Place stand tube **3** in the sleeve **4** and tighten fast with the headless screws **5**
- * If necessary, the base frame can be aligned using the cylinder-head screws **6**

To be able to fasten the base frame with screws, maximum size 10 mm diam. possible, on the bottom, the two setting screws **6** and the front plastic caps **7** must be removed.

- * Place SK 100 on the base frame **Fig. 3**
- * To fasten the hexagon screws **SCH** M8x35 supplied with the base frame, use spring washers and hexagon nuts

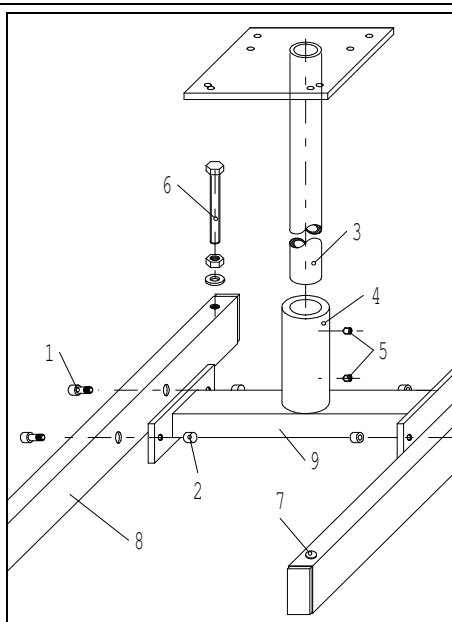


Fig.1

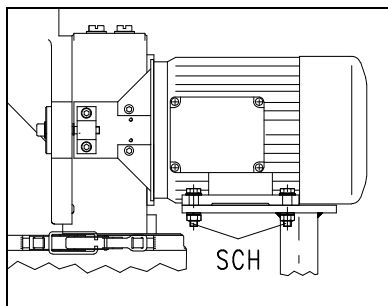


Fig.2

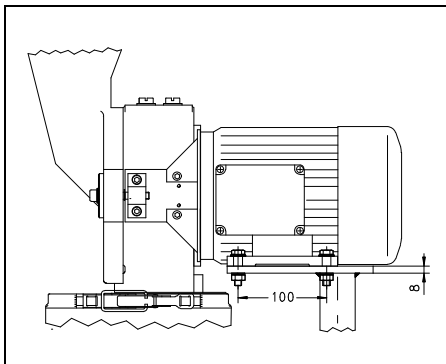


Fig.3

Setting up on a laboratory table

You can mount the SK 100 on your laboratory table. **Fig. 3**

- * Measure laboratory table thickness
- * Use screws with a maximum diameter of 8mm and a length of the laboratory table thickness + 25 mm
- * Stand the SK 100 including collecting vessel on the table
- * Mark the holes for the SK 100 for the table with reference to the holes on the motor

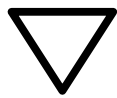
The distance between the holes on the front edge of the table must be such that the collecting vessel or filter hose can be mounted and dismantled easily.

Electrical connection

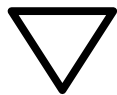
- * The voltage and frequency of the SK 100 can be found on the nameplate.
- * Ensure that the values agree with the power supply available.
- * Connect the SK 100 to the power supply using the connecting cable supplied.

The power cable supplied does not have a plug because the type of plug depends on the setting up location and the respective national regulation.

- * When connecting the power cable to the power supply, provide an external fuse in accordance with the regulations of the setting-up location.



If the values are not observed, electronic and mechanical components may be damaged.



Before first use, the direction of rotation must be checked, see arrow on motor.

If the direction of rotation is incorrect, the grinding will be insufficient and mechanical components may be damaged.

Operation

Target group: Users

Control elements and operation

Graphic view of control elements:

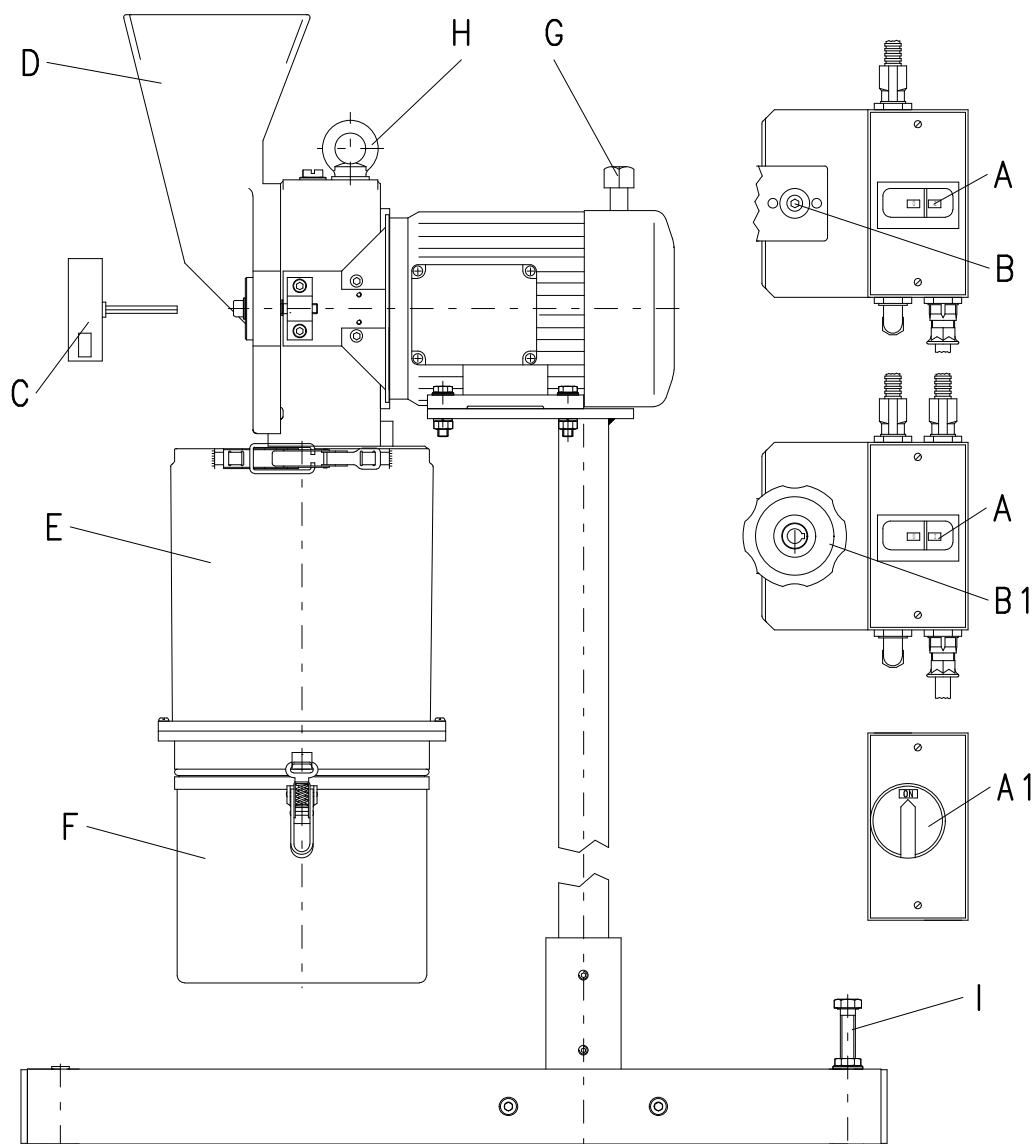
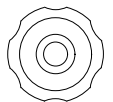
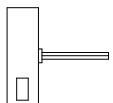
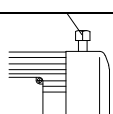
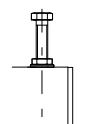


Fig.4

Control elements and their function

Overview Fig.4

Item	Element	Symbol	Function
A	Power switch with ON/OFF button		Isolates the SK 100 from and connects it with the power supply I pressed = SK 100 is switched on 0 pressed = SK 100 is switched off
A1	Power switch with knob		Isolates the SK 100 from and connects it with the power supply ON = SK 100 is switched on OFF = SK 100 is switched off
B	Door seal cylinder-head screw only with SK 100 standard		Opens and seals the door of the SK 100 standard, tensions the door seal clockwise = seals the door anticlockwise = opens the door Tool needed = Spanner C
B1	Door seal handwheel only with SK 100 comfort		Opens and seals the door of the SK 100 comfort, tensions the door seal Pressed in and turned clockwise = seals the door Pressed in and turned anticlockwise = opens the door
C	Key for door seal B , only with SK 100 standard		Is needed to open and close the door seal with the cylinder head screw on the SK 100 standard
D	Filling funnel at door		Takes the material to be crushed with a maximum grain size of 20mm; does not serve to store material; Reliably prevents material being crushed from flying out.
E	Filter hose	o. Fig.	Prevents build-up of the air pressure caused by rotating cross beater and thus accelerates material throughput.
F	Collecting vessel 5l	o. Fig.	Takes crushed material.
G	Release lever for motor brake only with SK 100 comfort		When pushed back, makes it possible to release the motor brake and thereby allows manual turning of the cross beater for cleaning purposes.
H	Transport bolt		Prevents damage to mechanical and electrical components during transport
I	Adjusting screws on base frame		Make it possible to align the base frame on uneven floor When screwed out, they expose the openings which permit fastening of the base frame to the floor, Ø10mm

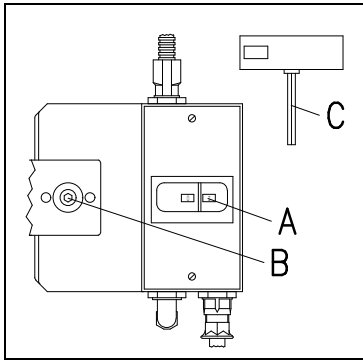


Fig.5

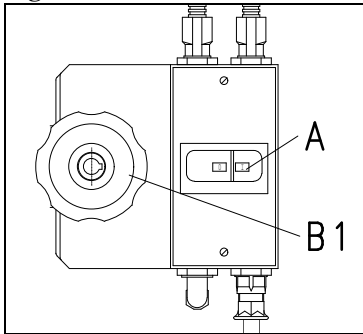


Fig.6



Only close the door if the contact surfaces are absolutely free of material being crushed or other contaminants.
Mechanical components and the seal may be damaged.

Do not open the SK 100 with the motor running.
When crushing toxic or otherwise health-impairing materials, there is a danger that health-hazardous particles may be inhaled.

Do not open the SK 100 and the motor brake simultaneously.
Danger of injury from unbraked cross beater.

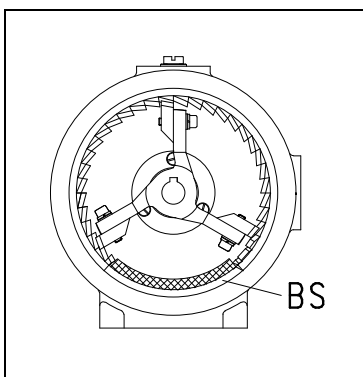


Fig.7

Opening and closing of the mill housing

SK 100 standard

Only open with the SK 100 disconnected, even if a limit switch on the left hand side of the mill housing switches the SK 100 off when the door is opened.

- * Press the button **O** at the main switch **A** or turn to **OFF** position **Fig. 5**
- * Put key **C** in screw **B**
- * When the key is turned in clockwise direction, the housing is opened
- * Close in reverse order

SK 100 comfort

Only open with the SK100 disconnected.

- * Press the button **O** at the main switch or turn to **OFF** position **Fig. 6**
- * Push handwheel **B1** and turn in anti-clockwise direction
- * Handwheel latches into end position
- * Close in reverse order

Insert bottom sieve

Bottom sieves **BS** of stainless steel with Conidur or round holes are available for selection as accessories. **Fig. 7**

Conidur 0.12/0.20/0.50/0.75/1.0/1.5/2.0mm

Round hole 3.0/4.0/5.0/6.0/8.0/10.0mm

- * Stop SK 100
- * Open mill housing
- * Push in bottom sieve **BS**
- * Close mill housing

Ensure that the collecting vessel has been mounted.

- * Start the SK 100

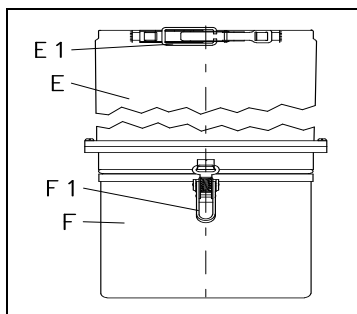


Fig.8

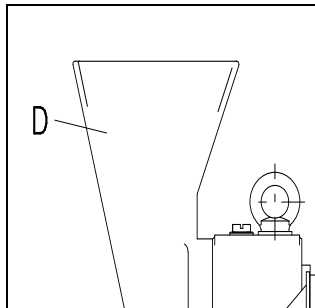


Fig.9

Filter hose and collecting vessel

With the use of a fabric filter hose between the SK 100 and collecting vessel, the air stream arising due to the rotating cross beater is taken off and this prevents a jam. Furthermore, it speeds up the material throughput and ensures a gentle crushing process.

- * Push filter hose **E** over the flange and at the same time hold the clamping clip at an angle
- * Clamp seal **E1**
- * Hang in collecting vessel **F**
- * Clamp seals **F1**

If the collecting vessel is mounted without filter hose, it must be expected that dust will be emitted from the filling funnel **D**.

Feed material to be crushed

The maximum feed grain size should not exceed 20mm.

For batch or continuous operation, the SK 100 can be retrofitted with a 30 l plastic container and a DR 100/75 vibratory feeder as accessories.

- * Feed material slowly into the filling funnel **D** Fig. 9

A rebound safety device fitted in the filling funnel prevents the material being crushed from being thrown back.



Feed material slowly and continuously into the filling funnel.

An excessive feed quantity may force the SK 100 to come to a standstill and mechanical components may be damaged.

During crushing, material in dust form may escape from the filling funnel. In the case of toxic and otherwise health-impairing materials, use an extractor.

Danger if health-hazardous dust is inhaled.

Some materials form explosive mixtures.

Check the material properties of your crushing device.

Danger of explosion.

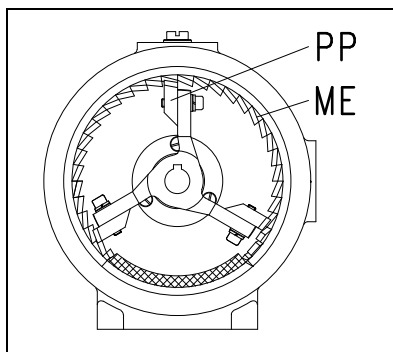


Fig.10

Reset impact gap

From time to time the gap between the grinding insert and the impact plates of the cross beater should be checked.

Fig. 10

- * Pull out mains plug
- * Open mill housing
- * Check gap between the grinding insert **ME** and the impact plate **PP** using a leaf gauge = **required ~1 mm**, the gap leading to the bottom sieve should not be <1 mm.
- * If necessary reset impact plates using SW5 socket spanner

Mounting a vibratory feeder

When feeding larger quantities, it is advisable in general to feed the material to be crushed evenly using a feed device. This largely prevents any unnecessary load on the grinding tools and reduces possible friction heat. A suitable means of providing an even material feed is the DR 100/75 vibratory feeder available as accessories.

Fig. 14

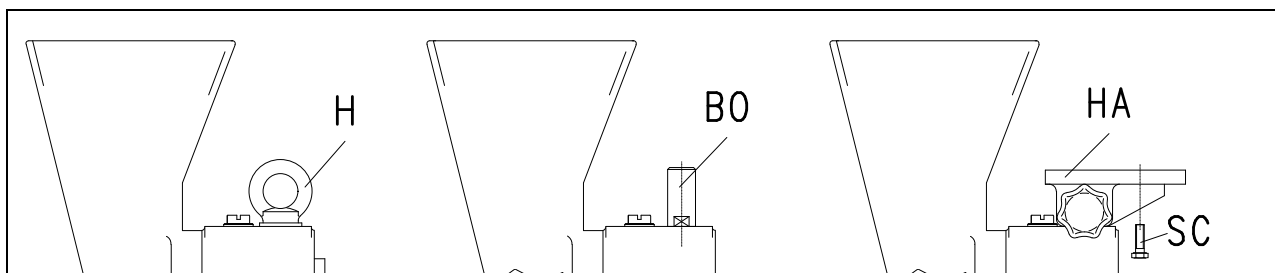


Fig.11

Fig.12

Fig.13

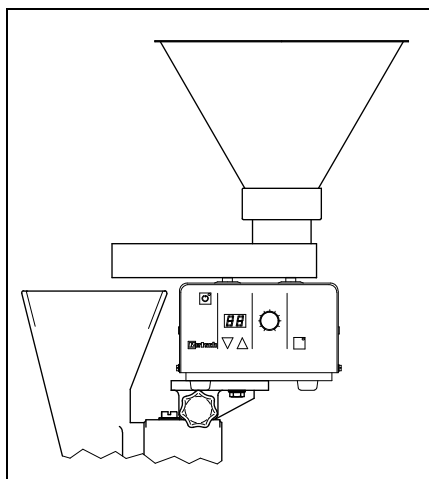


Fig.14

Prepare the DR 100/75 for feed operation in accordance with your operating instructions.

Mounting :

- * Screw out ring bolt **H**, Fig.11
- * Screw in bolts **BO**, Fig.12
- * Push on fixture **HA** with T screw, Fig.13
- * Tighten T screw
- * Mount and align DR 100/75
- * Fasten with the two hexagon screws **SC** M6x20 DIN933, Fig.13
- * Plug power connection cable of the DR 100/75 in a socket outlet with earthing contact
- * You will find the voltage and frequency of the DR100/75 indicated on the nameplate



If the values on the nameplate are not adhered to, electronic and mechanical components may be damaged.

Working instructions

Target group: Laboratory personnel

General

The SK 100 is a highly modern, efficient product from F.Kurt Retsch GmbH & Co.KG.

Thanks to a large selection of accessories, the SK 100 is a unit with versatile practical possibilities mainly in the chemical and ceramic fields, in mining and in metallurgy, as well as in the preparation of soil samples etc. in laboratories and in industry.

The SK 100 is mainly used for the precrushing and fine crushing of medium-hard to hard and brittle materials to approx. 6 according to Mohs.

End fineness

The achievable end fineness depends on the hole width of the bottom sieve and the crushing properties of the material. In favourable cases, finenesses of < 100µm are possible.

The SK 100's mode of working

Crushing in the SK 100 cross beater mill takes place through beating, impact and shearing action.

Once the material has been fed into the feeding funnel, it passes into the grinding chamber, where the crushing process takes place between the cross beater, the grinding insert and the bottom sieve.

As soon as the material being crushed has reached the relevant end fineness, it passes through the bottom sieve and into the collecting vessel.

With the use of a fabric filter hose between the SK 100 and the collecting vessel, any build-up of the air flow caused by the rotating cross beater is prevented and the material throughput is partly accelerated.

This ensures a gentle crushing process.

General

Cleaning

The SK 100 can be cleaned with normal brushes, paintbrushes and possibly an industrial vacuum cleaner, as well as compressed air.

To clean the grinding chamber of the SK 100 comfort the motor brake can be released at lever **G** (**Fig.15**). The cross beater can now be easily turned and this facilitates cleaning.

The type of protection for the SK 100 is IP54.

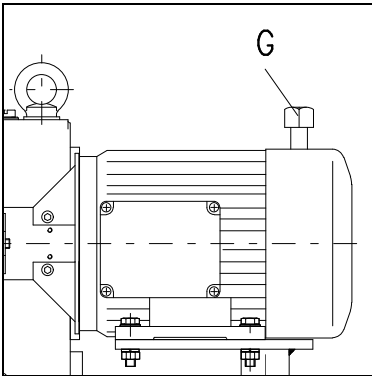


Fig.15



Do not clean SK 100 with flowing water.
Danger of fatal electric shock

Servicing

The SK 100 is largely maintenance-free.

From time to time the gap between the grinding insert and the impact plates of the cross beater should be checked.

Fig.10

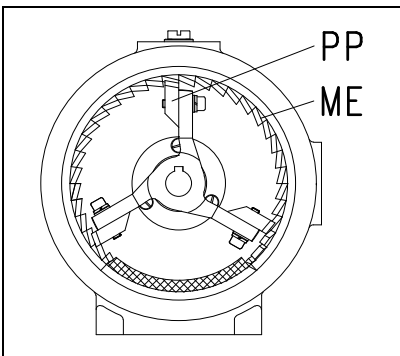


Fig.10

- * Pull out mains plug
- * Open mill housing
- * Check gap between grinding insert **ME** and impact plate **PP** using a leaf gauge = **required 1mm**
- * If necessary reset impact plates using a socket spanner SW5

Necessary tests

Every six months the limit switches and the motor brake should be checked with proper regard to.

SK 100 standard

Limit switch to the left on the door hinge

- * With an opening gap of 3mm max. the limit switch must cause the motor to cut out

SK 100 comfort

Limit switch to the left on the door hinge

- * With an opening gap of 3mm max. the limit switch must cause the motor to cut out

Limit switch to the right on quick-acting closure

- * When the handwheel is turned a maximum of 45° the motor brake must be activated.

Motor brake

- * Start SK 100
- * Stop SK 100
- * Measure the braking time using a stopwatch
- * Should the braking time exceed 0.5 seconds, contact the service technicians

Accessories

- * Base frame
- * Collecting vessel 30l
- * Filter hose for 30l vessel
- * Stand for DR 100/75 vibratory feeder
- * DR 100/75 vibratory feeder
- * Dirt collecting pan of plastic
- * Conidur bottom sieve from 0.12 to 2.0mm
- * Round hole bottom sieves 3.0 to 10mm

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Changes

We reserve the right to make technical changes.

Safety instructions (table)

for the SK 100 taken from the chapters

Procedure	Action	Dangers
Safety	Not paying attention to the safety instructions can lead to damage to people and property.	Claims for damage are excluded in whatever form.
Packaging	Please retain the packaging for the duration of the guarantee period.	In the case of complaint your warranty rights can be endangered if the item is returned insufficiently packaged
Transport	During transportation the SK 100 should not be knocked, shaken or thrown.	Electronic and mechanical components can become damaged.
Temperature variations	With severe variations in temperature, the SK 100 must be protected from condensation.	Electronic components can become damaged.
Scope of delivery	In the case of the delivery being incomplete and/or transport damage, you must inform the carrier and Retsch GmbH immediately (within 24 h).	Later complaints can under certain circumstances no longer be considered.
Environmental temperature	Drops below 5°C Rises above 40°C	Electronic and mechanical components can become damaged. Performance data change by an unknown extent.
Air humidity	Rises above 80% at temperatures up to 31%	Electronic and mechanical components can become damaged. Performance data change by an unknown extent.
Electrical connection	Mains supply does not match the values given on the type plate.	Electronic components can become damaged.
	Before initial operation, the direction of rotation is to be checked, see rotation direction arrow on the motor	If the direction of rotation is wrong, no satisfactory milling will take place and mechanical components can become damaged.
Opening and closing of the mill's casing	Only close the door when the contacting surfaces are absolutely free of material for grinding or other contamination.	Mechanical components and the sealing can become damaged.
	Do not open the SK 100 when the motor is running.	When milling toxic or other materials harmful to health, there is a danger of inhaling dust hazardous to health.
	Do not open the SK 100 and at the same time bleed the motor brakes.	Danger of injury from the unbraked cross-beater.
Feeding of material for grinding	Feed the material for grinding slowly and continuously into the feed hopper.	A too great a rate of feeding can force the SK 100 into stopping and mechanical components can become damaged.
	During milling, dust can rise from the material in the feed hopper. With toxic or other materials that are harmful to health, use a extractor appliance.	Danger of inhaling dust hazardous to health.
	Some materials can form an explosive mixture with air. Check the properties of the material you wish to grind.	Danger of explosion.
Installation of a vibratory feeder	Pay attention to the details on the type plate.	If attention is not paid to the values on the type plate, electronic and mechanical components can become damaged.
Cleaning	Each time before cleaning, pull out the mains plug.	Danger of death by electrocution.
	Do not clean with running water.	Danger of death by electrocution.

Warranty Conditions

1. If legitimate claims are made we shall remedy the defect or replace the goods free of charge.

The purchaser shall only have a right to rescind the contract or reduce the purchase price if we have decided that it is not possible to remedy the defect and a replacement delivery cannot be made or the time limit therefore cannot be complied with or if a reasonable additional time limit of six weeks granted by the customer has not been complied with due to our fault.

If the remedy or replacement delivery in fact fails the customer shall have the right to reduce the price or rescind the contract at his discretion. Further claims, in particular for damages in relation to damage not caused to the goods themselves, such as lost production, are excluded in so far as we have not acted wilfully or negligently. For goods produced by third parties we pass on the liability of the manufacturer.

2. We shall bear the costs directly incurred through the remedying of defects or the replacement delivery on the condition that claim is found to be legitimate. This also applies to the freight costs as well as the reasonable costs of removal and installation. The customer, however, undertakes to bear the reasonable costs of providing his own technicians and assistants on site.

If our customer carries on business overseas, however, we shall be entitled to pay the costs, in particular costs of transport, tolls, wages and materials, ex German border.

3. Our warranty period is generally six months. We do not give any warranty on parts subject to wear.

We give a warranty of two years as from purchase date when the warranty card is fully completed and returned to us within two weeks after purchase of the machines, but we do not give any warranty on parts subject to wear. The warranty period counts as from return of the warranty card. In case of initiation of the machine at a later date as of initiation, which has to be indicated on the card. The machine should be put into operation no later than 6 months after purchase date. This warranty is based on single-shift laboratory operation. For multiple-shift operations or other environments the warranty period will be respectively shorter.

4. We warrant that our goods are free from manufacturing defects. The suitability, classification and function of our goods are determined exclusively on the basis of the performance descriptions contained in the order confirmation even if these differ from the order. In the latter event the customer may, within two weeks after receipt of the order confirmation, draw any possible difference from the order to our attention and come to an agreement on these with us. If the customer does not object to the specifications in the order confirmation then these shall be deemed to have been accepted.

Unless an agreement to the contrary has been reached, we shall not be held liable for the suitability of the goods delivered for the use to which the customer intends to put them. The same applies to performance figures expected by the customer unless we have been able to carry out appropriate preliminary practical experiments and have, in our order confirmation, declared in writing that these performance figures shall be binding.

5. Our warranty shall also become invalid if persons other than those employed by us carry out repairs or in any other way interfere with or make alterations to the goods delivered by us or do not use suitable parts to the extent that the defect is causally connected thereto. In addition, it is a condition of our warranty that our directions for use and operation be followed.
6. If, without a release having first been obtained from us, the goods are installed in and /or connected to, attached to or incorporated in other systems or production plants then our guarantee is limited exclusively to the parts delivered by us.
7. The remedying of defects or replacement of defective parts shall, at our discretion, be carried out on site or at the seat of our company. If the repair is carried out on site, the customer shall ensure that our employee has access, unlimited in either time or space, to the purchased item. In addition, the customer may only demand that work necessary in order to fulfil warranty obligations be carried out during the normal local business hours. If such work is carried out outside our normal business hours on request, the customer shall bear the additional costs. If he wishes to have other particular work performed which goes beyond the work warranted then these costs shall be payable at the actual valid price.